(i)
ACKNOWLEDGEMENT

The workstudy team expresses their sincere thanks to Sr.DEE/G/TVC, DEE/C/TVC, ADEE/G, SSE/Power/QLN, SSE/Power/NCJ & SSE/E/HQ/TVC and staff of Electrical Branch for their assistance and co-ordination in conducting this work study.

(ii)
AUTHORITY

Annual programme of work studies approved for the year 2018-2019.

(iii)
TERMS OF REFERENCE

Work Study to review the staff strength at SSE/Power/QLN & NCJ – Tiruvananthapuram Division.

(iv)
METHODOLOGY

The work study team has applied the following methodologies in conducting the work study.

1. Collection of data from field units and divisional office.
2. Observation of present day activities of the Unit and in the field.
3. Interaction with supervisors and other staff.
4. Identification of areas where reorientation / re-organisation of work can be achieved.

5. Analysis of data and all inputs and arriving at the recommendation.

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(v)

SUMMARY OF RECOMMENDATIONS

RECOMMENDATION - 1

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CHAPTER – I

1.0 INTRODUCTION:

Electrical Department of Indian Railways is responsible for the operation and maintenance of the Electrical assets, as well as construction activities involving electrical installations.

Electrical Rolling stock – Operation and maintenance of Electric Locomotives, electrical multiple units and Mainline electrical multiple units.

Electrical Traction Distribution installations – Operation and maintenance of Traction Substations, Switching stations and Traction overhead power supply systems and Supervisory Control & Data Acquisition systems.

Electrical General Services – Operation and maintenance of Train Lighting and Air-Conditioning equipments in Coaches - Operation and maintenance of HT & LT Power Distribution, Standby generators power backup systems, Lighting, Ventilation, Air-Conditioning, Lifts, Escalators and Pumping in Stations, Offices, Workshops, Railway colonies, Railway Hospitals, Passenger Reservation systems, Level crossing gates, etc.

In Southern Railway, Power supply for Railway Electric Traction is availed from State Electricity Boards of Tamil Nadu (TANGEDCO), Kerala (KSEB), Andhra Pradesh (APTRANSCO) and the Power supply for General Services is availed from State Electricity Board of Karnataka (KPTCL) also in addition to the three other State Electricity Boards indicated above.

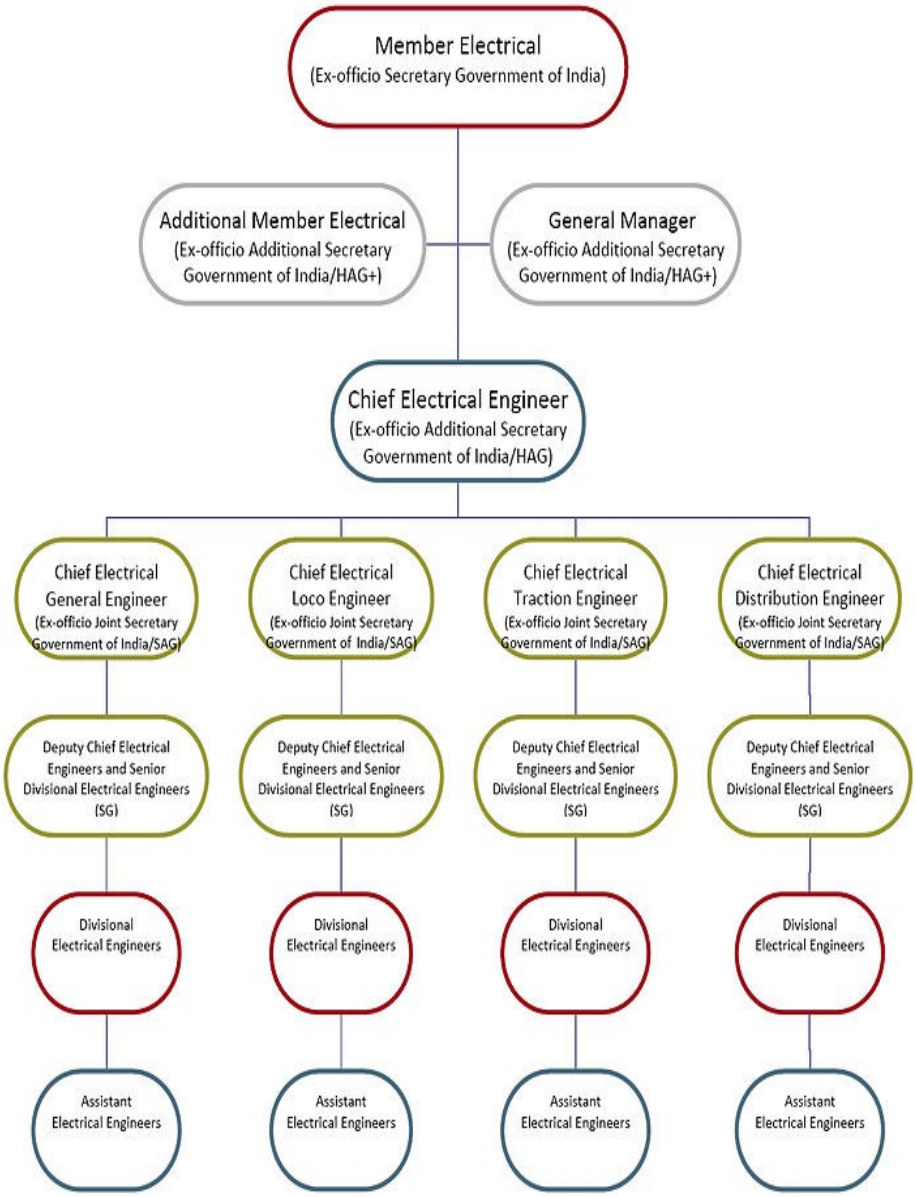
ORGANISATIONAL SET UP:

At the RB level, the Department is headed by a Member (Electrical). At the Zonal level, Chief Electrical Engineer is the Principal Officer of the Electrical Department. He is assisted by Chief Electrical Services Engineer, Chief Electrical Loco Engineer, Chief Electrical Distribution Engineer, Chief Electrical Traction Engineer and Chief Electrical Workshop Engineer. He also functions as the Electrical Inspector to Government for the Railway.

The CEE reports to the General Manager of the Railway. The office of the Member (Electrical) of the Railway Board guides the CEE on technical matters and policy.

At the divisional level the Sr Divisional Electrical Engineers (General, Traction Operation, Traction Distribution, Electrical Loco Shed) head the organization. The Sr.DEE/DEE reports to the Divisional Railway Manager of the Division. Technical supervision is provided by the zonal Chief Electrical Engineer.

Organisation



The department, at the Divisional level is divided into a number of functional units vested with one or more of the functions of the department elaborated in the previous paragraphs.

The units considered for this study, viz SSE/Power/QLN & NCJ are two such units that takes care of General services maintenance of the assets under its jurisdiction.

[illegible].

CHAPTER – II

2.0 PRESENT SCENARIO

DUTIES PERFORMED BY STAFF OF SSE/POWER

- Maintaining and attending to petty complaints of Quarters.
- Maintaining and attending to Quarters street lights.
- Attending to Electrical works when Vacation and Occupation of Quarters.
- Maintaining and attending fuse calls in Co-ordination with EB.
- Maintaining and attending to Service building failures.
- Maintaining and attending to Platform lighting including Passenger Amenities, Yard lighting, approach road lighting and LC gates.
- Maintaining and attending to water pumping facilities in case of emergencies.
- Maintaining and attending to UPS and Generators at all the PRS/UTS stations.
- Maintaining and attending to AT CLS panels for uninterrupted supply of Power.
- Fan OH work.
- Monthly quarters reading and private stalls and posting in EMIS for recovery.
- Replacing of silica gel, breather oil and cleaning of transformers and its premises.
- Tree pruning in the whole jurisdiction.
- Cleaning of water coolers.
- Cleaning of earth pits, recording of earth values and painting of pits.
- Painting all the structures of poles in the whole jurisdiction.
- Collection of materials from Stores and Firms.
- Meter reading.

2.1 This work study pertains to Two Units of Electrical Department of TVC Division viz,

(1) SSE/Power/QLN

(2) SSE/Power/NCJ

2.1.1 SSE/Power/QLN:

2.1.2 Jurisdiction:

QLN Jurisdiction Covers a total of …… KMs.		
IRP – TRVL		
TOTAL		
TOTAL NO. STATIONS		
Block stations		
Halt stations		
CNC stations		
Total LC Gates		
Total Pumping station		
Total AT Panesl (CLS Panels)		
Total Power Line crossing	110 KV	
	220 KV	
	400 KV	
	OH/EHT	
	440 V (LT)	
	11 KV	
	22 KV	
	33 KV	
	UG	
	TOTAL POWER LINES	
Total Quarters in Jurisdiction		
Total Service Buildings		

2.1. 3 STAFF POSITION**:**

The S.A.V.E Statement for staff working under the Administrative control of SSE/P/QLN is given below.

	POWER			
Category	S	A	V	E
SSE	1	1	0	0

JE	1	1	0	0
Sr.Tech.	2	4	0	2
Tech.Gr.I	10	4	6	0
Tech.Gr.II	2	0	2	0
Tech.Gr.III	1	2	0	1
Helper	0	0	0	0
TOTAL	17	12	8	3

2.1.4 Deployment of Staff: (POWER/QLN)

Power/QLN Generator Duty 8.00-16.00 hrs. - 2 staff
Pump Duty - - 3 staff
RG for both Generator & Pump - 1 staff

Regular maintenance work over SSE/P/QLN jurisdiction - 12

2.1.5 **TWO YEARS POWER CONSUMPTION UNITS FOR ALL ACTIVITES OVER THE JURISDICTION OF SSE/P/QLN:**

Months	2016 – 17	2017 – 18
Apr		
May		
Jun		
Jul		
Aug		
Sep		
Oct		
Nov		
Dec		
Jan		
Feb		
Mar		
Total		

AVERAGE UNITS PER MONTH .. 1223802/12 = 101983.5

As per the Railway Board letter No.2001/Elect./G/138/3 dated 16.03.06, norms for Man Power Planning is given as 0.20 staff/1000 units per month. Hence, staff required based on the above formula = 0.20 x 101983.5/1000 =

20.3967 or say 20 staff.

2.4 Machines introduced:

In the last 5 years, New UPS, CLS panels and Community Hall PUMP were introduced.

2.5 Failures :

1. AT supply to CLS failed at ULU on 17.8.14. LTUG cable found short circuited and replaced the same (256 meters) received from RVNL/L&T and laid. AT power supply was restored.
2. At ALU, auto mode in CLS panel was not working and PCB failed. Attended and rectified.
3. At PVN during OCT 2014M Panel board was short circuited and melted due to heavy lightening and the same was attended and rectified.
4. TLNR station during March 2015 CLS panel failed, Defective panel was removed and replaced on 17.03.2015.

2.6 Pump failure details for the period from April 2012 to March 2015

Pump failures are being attended and pumps need to be pulled out and repaired or replaced. This requires lot of man hours as it is manually done without any machines.

2.7 Generator and UPS failure for the period from April 2012 to March 2015:

1. After the expiry of AMC for DG sets on 11.08.2014, minor failures are being attended and major failures are given to outsiders for repair.
2. AMC for Hykon UPS is still alive. Other UPS like NUMERIC AND Power One do not come under AMC which are being attended by the staff of the depot

2.8 Outsourcing:

AMC DG SET	AMC UPS	Fire extinguisher

Period	Name of the firm	Period	Name of the firm	Period
Apr.,12 to expire on 11.08.2014 vide DEE/G/TPJ Ltr.No.T/ E.29/AMC/DG Set/2014 dt. 27.5.2014	H1 Tech Diesel services, A-47 Rasathinagar 2nd cross, Kamarajarsalai, Karaikal	November 2013 NOV to continue (Ariyalur-1, Perambulur-2 and VRI-1 all other station AMC not available due all station Numeric UPS available	Hykon India (p) ltd. IkkandaWarrier road, Thirussur	March 2013 to June 2014

2.9 New Proposals:

As RVNL doubling work is in progress in the section, the quantity of assets increases after its completion and hence the work load increases.

After completion of RVNL doubling project, in view of increased assets, present staff strength would not be sufficient.

2.10 Training:

4 man days were spent on training at ETC/PER in last 3 years.

2.2.1 SSE/POWER/NCJ :

SSE/POWER/NCJ has the following jurisdiction.

NCJ station location –	
VM – LC 155 (ULU)	
VM – PDY (LC – 47)	
VM – PRT (LC – 133)	
VM – KPD (LC – 129)	
TOTAL	
TOTAL NO. OF STATIONS AVAILABLE IN THE ABOVE SECTIONS	
Block stations	
CNC stations	
Total LC Gates	

Total Pumping stations	
Total AT Panels (CLS Panels)	
Total Power line crossing	
OH/EHT	
HT/LT - UG	
Total quarters in Jurisdiction	
Total service buildings	

2.11.2 STAFF POSITION:

The S.A.V.E Statement for staff working under the Administrative control of SSE/POWER/NCJ is given below.

	SSE/POWER/NCJ			
Category	S	A	V	E
SSE	1	1	0	0
JE	2	2	0	0
Sr.Tech.	3	6	0	3
Tech.Gr.I	7	3	4	0
Tech.Gr.II	1	0	1	0
Tech.Gr.III	2	2	0	0
Helper	0	0	0	0
Total	16	14	5	3

2.11.4 DEPLOYMENT OF STAFF:

2.11.5 AT VM:

- Generator Duty - 6 staff
- Pump duty - 5 staff
- RG for both Generator & Pump duty 3 staff
- Maintenance works 28 staff

2.11.6 Area wise allocation of staff:

Area	No. of staff	Deails
New Loco Pump	3	Sr.Technician -1 Technician Gr.I -2
3 Pump sets 1- Borewell, 1 GLR, 1 Sewage	2	Tech.Gr.1 – 2

pump		
RG	1	
Generator Duty	6	3 shifts x 2 = 6
RG	1	
R.R. Pump	3	
Station area	3	
North Colony	3	
South Colony	3	
Office	2	
Meter reading	2	1- colony 1- private consumptions
Service Buildings	3	
Total	32	
PDY	5	
TNM	5	
TOTAL	42	

- Deployment of staff is based on Periodical and Preventive Maintenance and attending to failures when occurs.

2.11.9 AVERAGE CONUMPTION OF ELECTRICITY IN SSE/POWER/VM JURISDICTION DURING THE PERIOD APR-MAR 2013-14& APR – MAR 2014-15

	2013-14	2014-15
Total Average Readings	(Units)	
VM HT & LT	127811	139151
PDY HT	11472	10147
VM 250 KVA DG SET	6613	1773
VM-KPD section station & quarters	53438	11439
VM-TPJ Mainline station & LCs	4762	9115
VM-TPJ Chordline stations & LCs	3802	-
VM Karimettu Colony	1158	626
VM-PDY station & LCs	3128	4138
VM-KPD LC gates	3000	56500
Total	215184	232889
Average units/month	215184	232889

AVERGE CONUMPTION OF UNITS 224037

Requirement of staff based on the formula 0.20 staff/1000 units: 45 staff

2.11.10 Electrical Installations:

Pitline maintenance & stations at	

VM	
HT Sub-station (SS-1)	2 nos. 630 KVA Transformer
HT Sub-station (SS-2)	2 nos.400 KVA Transformer
HT Overhead line (in between SS-1 & SS-2)	700 Mtrs.
LT panel switch room	Distribution of feeders to Qtr and service buildings.
Total Tower lights	108 nos.
Pre-cooling points	32 nos.
Battery chargers	29 nos.
IOH shed	Cranes & AC Coach pit motor
PDY	
Pre-cooling points	20 nos.
Battery chargers	32 nos.
Total High mast	12 nos
VM	2 nos.
TNM	5 nos.
VLR	1 nos.
CBU	4 nos.
UPS	42 nos.
Total DG sets	49 nos.
HT OH line	2 KM
LT OH line	14 KM

2.12 Machines introduced:

No machines were introduced during the last 5 years.

2.13 Outsourcing:

AMC DG Set		Fire Extinguisher
Period	Name of the firms	Period
APRIL -12 to expire on 11.08.2014 vide DEE/G/TPJ lr. No.T/E.29/ AMC/DG set/2014 dt 27.5.2014	HI-Tech Diesel services, A-47, Rasati Nagar, 2nd Cross, Kamarajar Salai, Karaikal	March 2013 to June 2014

2.14 Failures:

Failure details are given in the Annexure-1.

2.15 Other details:

Aluminium paint for 1000 LSP posts in VM-KPD section was done during GM inspection.

VM New Loco pump sets are heavy weight item it’s difficult to lifting and erecting work.

Overhead line re-stringing work carried out.

VM-KPD section is lengthy section, if any complaints received from the stations, incharges difficult to attend immediately.

CHAPTER – III

CRITICAL ANALYSIS:

3.1 SSE/P/VRI :

Power Maintenance:

3.2 The work load is quantified in terms of Power consumption of the unit. As per the Railway Board`s circular No.2001/Elect/(G)/138/3 dated 16.03.2006, 0.20 staff per `000 units.

3.3 As per Para 2.8, Average consumption of Power by SSE/P/VRI per month is 101983.5 units. Hence, as per the above yard stick, the requirement of Man power is 0.20 x 101983.5/1000 = 20.3967 or say 20 staff.

3.4. Bench Marking of Electrical Power:

Bench Marking of Electrical Power has been classified as two groups viz. Divisions having consumption of more than 2300000 Units per month and Divisions having less than 2300000 units per month.

The details of Power Consumption by TPJ Division from April 2015 to September 2015 are furnished below.

MONTH	NO. OF UNITS
APRIL 2015	1706736
MAY 2015	1704277
JUNE 2015	1717313
JULY 2015	1707014
AUGUST 2015	1751857
SEPTEMBER 2015	1778831

As per the above details, TPJ Division is falling under the 2nd group i.e less than 2300000 units per month.

As per the Bench Marking of Electrical Power for the Month of October 15, BKN division of NWR and NED division of SCR have achieved 0.10 staff per `000 units as against IR average of 0.16 Men per `000 units In Southern Railway, PGT & SA Division has achieved the lowest ie 0.14.

Efficiency of an Organisation is assessed based on the Bench marking concept so as to adopt the same in other similar units to improve the same in future. In order to achieve the Targeted Operating Ratio of 88.5% it is very essential to keep the staff cost to the minimum. This can be done only by adopting the Bench marking methodology.

In the Power Maintenance, there are lot of areas such as UPS cell change / connection, Pit line / Sewage pump operation, FOC – Quarters, street lights,
Quarters meter reading & Operation of DG sets which can be outsourced for maintenance and repairs.

Even operation and maintenance of Motor pumps for water can also be outsourced so as to minimise the staff strength. While having adequate work load in Main activity i.e running of trains, it is very difficult to concentrate on the miscellaneous activities and delay or failure in attending the same will result in inconvenience to the users. Hence, the above activities can be outsourced.

In many locations automation of operation of Pumps have been implemented so that staff need not be spared for this purpose.

An attempt has been made to study the management of staff quarters by other Central Government Establishments such as Reserve Bank of India, C.P.W.D it is seen that the Housekeeping activity including repairs and maintenance of electrical item has been outsourced. Railways are a huge organisation where number of staff quarters is more. It is not judicious method to maintain the same by utilising the Organised Man Power when there is possibility for outsourcing such activities.

If all the activities pertain to Staff quarters such as operation of Motor Pumps, DG sets, attending to repairs and maintenance of Electrical installations including Colony street lights, Cleanliness in colony areas including roads, certainly a sizable amount of Man Power in respective department will be saved on this account.

The work study team proposes to adopt the Bench Marking as the methodology to arrive the Man Power requirement. According to the Bench marking of October 15, as per the above details, 0.14 Men per `000 units achieved by PGT & SA Divisions. Hence, the total requirement based on this methodology is as follows.

Average Consumption per month is 101983.5 units.

Bench Marking is 0.14 staff per `000 Units.

Requirement of Man Power is =101983.5/1000x0.14=14.27or say 14 staff.

This includes LR/RG also.

RECOMMENDATION - 1

SANCTION	ACTUAL	REQUIRMENT	SURPLUS
23	23	14	9

3.6 SSE/P/VM:

3.6.1. **Bench Marking of Electrical Power:**

As per the Bench Marking of Electrical Power for the Month of October 15, BKN division of NWR and NED division of SCR have achieved 0.10 staff per `000 units as against IR average of 0.16 Men per `000 units In Southern Railway, PGT & SA Division has achieved the lowest ie 0.14 staff per `000 units.

Average Consumption per month is 224037 units.

Bench Marking is 0.14 staff per `000 Units.

Requirement of Man Power is =224037/1000x0.14=31.36 or say 31 staff.

3.6.2 SSE/P/VM

RECOMMENDATION - 3

SANCTIONED	ACTUAL	REQUIREMENT	EXCESS
48	42	31	17

CHAPTER - IV

4.0 PLANNING BRANCH'S REMARKS ON CO-ORDINATING OFFICER'S VIEWS.

CHAPTER - V

5.0 FINANCIAL SAVINGS

5.1 If the recommendations made in the study report are implemented, the annual recurring financial savings will be as under:

Sl. No.	Category	Grade pay (Rs.)	No. of posts	Mean Pay (Rs.)	Total Annual savings (Rs.)
1.	Technician Gr..I	2800	12	33015	4754160
2.	Technician Gr.II	2400	3	33069	1190484
3.	Technician Gr.III	1900	11	31974	4220568
4.	Helper	1800	28	31755	10669680
TOTAL			**54**		**20834892**